

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously presented) A method of centralized data position information storage and utilization comprising the steps of:

arranging a byte stream of data into partitioned logical data;

storing data position information relating to said logical data in a reserve storage area;

transferring said information from said reserve storage area to a centralized storage area, wherein said centralized storage area is configured to store said information relating to substantially all said partitioned logical data; and

locating target data that is part of said logical data by applying a search algorithm to said data position information stored in said centralized storage area,

said search algorithm being configured to locate said target data.

2. (Canceled)

3. (Amended) The method as claimed in ~~any one of~~ claim 1, wherein said logical data comprises:

records and filemarks; wherein said centralized storage area stores data position information relating to said records and said filemarks in a data table, the locating step including reading from the data table the stored position information relating to said records and said filemarks.

4. (Previously presented) The method as claimed in claim 1, wherein said centralized storage area stores logical data position information relating to a plurality of selected logical data groups, the locating step including reading the stored logical data position information relating to the plurality of selected logical data groups.

5. (Previously presented) A method of storing and utilizing data position information on a tape data storage device, said method comprising the steps of:

arranging a byte stream of data into partitioned logical data;

recording said logical data onto a length of tape;

storing data position information relating to said logical data in a reserve storage area;

transferring said information from said reserve storage area to a centralized storage area located within said tape device, wherein said centralized storage area stores said information relating to substantially all said partitioned logical data; and

31 locating target data on said tape by applying a search algorithm to said data position information stored in the centralized storage area, said search algorithm being configured to locate said target data;

determining the required transporting of said logical data relative to a read head to enable said target data to be read; said target data being part of said logical data; and

reading said target data by using the read head when the logical data is at the read head.

6. (Previously presented) The method as claimed in claim 5 wherein the step of transferring said data position information comprises:

transferring said information to a data table within said centralized storage area;

arranging said information within said data table so as to minimize the time period taken to locate said target data on said tape when utilizing said information.

7. (Canceled)

8. (Previously presented) The method as claimed in claim 5, wherein said data position information in said centralized storage area relates to a plurality of selected data groups, said data groups being distributed along the length of the tape.

9. (Previously presented) The method as claimed in claim 5 further comprising the step of: transferring said data position information in said centralized storage area to a reserve storage area.

10. (Previously presented) A data position information storage and utilization device comprising:

partitioned logical data distributed across a length of tape;

a reserve storage area storing data position information relating to said logical data;

a centralized storage area configured to store said information received from said reserve storage area, said centralized storage area being configured to store information relating to substantially all said partitioned logical data;

a search algorithm for determining the location of target data on said tape; and

a read head configured to read said logical data on said tape;

said device being operable, in response to a request for said target data, to locate said target data on said tape in response to (a) information in said centralized storage area and (b) the target data location determined by the search algorithm, and to read said target data by using said read head.

11. (Original) A device as claimed in claim 10 wherein said reserve storage area is located on at least one portion of said tape.

12. (Previously presented) A device as claimed in claim 10, wherein said reserve storage area is in a cartridge memory.

13. (Previously presented) A device as claimed in claim 10, wherein said centralized storage area is located substantially within a tape drive including said read head.

14. (Canceled)

15. (Canceled)

16. (Previously presented) The method of claim 1 wherein the reserve storage area is volatile memory external to the tape, and erasing the volatile memory in response to the tape being removed from a device for reading the tape.

17. (Previously presented) The device of claim 10 wherein the reserve storage area is volatile memory external to the tape.

31 18. (Previously presented) The method of claim 5 wherein the tape includes plural parallel tracks and the algorithm derives a physical target position for a track different from the track where the head is positioned in response to indications of logical current and logical target positions and causes the head to move the physical target position without going to a beginning of wrap or an end of wrap.

19. (Previously presented) The device of claim 10 wherein the tape includes plural parallel tracks and the algorithm is arranged to derive a physical target position for a track different from the track where the head is positioned in response to indications of logical current and logical target positions to cause the head to move the physical target position without going to a beginning of wrap or an end of wrap.

B1 20. (Previously presented) The device of claim 19 wherein the reserve storage area is volatile memory external to the tape.

21. (New) Apparatus for enabling a tape to be driven from an initial position associated with an initial record number and initial file mark to a desired location associated with a desired record number and desired file mark in response to a request for retrieval of the data at the desired record number and desired file mark, the tape having parallel tracks, comprising:

a storage device external to the tape for storing (a) record numbers and file marks and (b) data set numbers on the tape and numbers of tracks on the tape, the stored record numbers and file marks corresponding with the stored data set numbers and track numbers, and

a processor arrangement arranged to be responsive to (a), (b) and (c) the desired record number and the desired file mark for determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark.

B2 22. (New) The apparatus of claim 21 wherein the tape includes partitioned logical data distributed along the length of the tape and data partition information, the apparatus being in combination with a drive for the tape and a head for reading the tape, the drive being arranged to be responsive to the determined data set number and the determined track number and the data position information on the tape for positioning the head at the determined data set number and the determined track number.

23. (New) The apparatus of claim 22 wherein the tracks include beginning of wrap and end of wrap regions, the processing arrangement and the drive being arranged for causing

the head to move from the initial position on one of the tracks to the desired location on another of the tracks without crossing the beginning of wrap or end of wrap regions.

24. (New) The apparatus of claim 21 wherein the processor arrangement is arranged for determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark by (i) determining the current physical position of the head relative to the tracks in response to (a) and (b), (ii) estimating the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark based on current position parameters, and (iii) iteratively changing the estimated location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark until the correct location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is found.

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25. (New) The apparatus of claim 24 wherein the processor arrangement is arranged to perform (iii) by (1) determining if the determined location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is greater or less than an indication of the current position of the head relative to the tracks, (2) changing the indication of the current position by $+N$ and $-N$ in response to the desired location being respectively greater and less than the current position, where N is a predetermined number of data sets, (3) reading the record numbers and file mark numbers and data set numbers and track numbers for the location associated with the indication of the current position $\pm N$, (4) making a new estimate based on (3), and (5) repeating (1), (2), (3) and (4) until the correct target

position is found.

26. (New) Apparatus for enabling a tape to be driven from an initial position associated with an initial record number and initial file mark to a desired location associated with a desired record number and desired file mark in response to a request for retrieval of the data at the desired record number and desired file mark, the tape having parallel tracks, comprising:

a storage device for storing (a) record numbers and file marks and (b) data set numbers on the tape and numbers of tracks on the tape, the stored record numbers and file marks corresponding with the stored data set numbers and track numbers, and

§2 a processor arrangement arranged to be responsive to (a), (b) and (c) the desired record number and the desired file mark for determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark, the processor arrangement being arranged for determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark by (i) determining the current physical position of the head relative to the tracks in response to (a) and (b), (ii) estimating the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark based on current position parameters, and (iii) iteratively changing the estimated location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark until the correct location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is found.

27. (New) The apparatus of claim 26 wherein the processor arrangement is arranged to perform (iii) by (1) determining if the determined location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is greater or less than an indication of the current position of the head relative to the tracks, (2) changing the indication of the current position by +N and -N in response to the desired location being respectively greater and less than the current position, where N is a predetermined number of data sets, (3) reading the record numbers and file mark numbers and data set numbers and track numbers for the location associated with the indication of the current position $\pm N$, (4) making a new estimate based on (3), and (5) repeating (1), (2), (3) and (4) until the correct target position is found.

B2 28. (New) The apparatus of claim 26 wherein the tape includes partitioned logical data distributed along the length of the tape and data partition information, the apparatus being in combination with a drive for the tape and a head for reading the tape, the drive being arranged to be responsive to the determined data set number and the determined track number and the data position information on the tape for positioning the head at the determined data set number and the determined track number.

29. (New) Apparatus for enabling a tape to be driven from an initial position associated with an initial record number and initial file mark to a desired location associated with a desired record number and desired file mark in response to a request for retrieval of the data at the desired record number and desired file mark, the tape having parallel tracks, comprising:

a storage device for storing (a) record numbers and file marks and (b) data set numbers

on the tape and numbers of tracks on the tape, the stored record numbers and file marks corresponding with the stored data set numbers and track numbers, and

a processor arrangement arranged to be responsive to (a), (b) and (c) the desired record number and the desired file mark for determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark, the tracks including beginning of wrap and end of wrap regions, the processing arrangement and the drive being arranged for causing the head to move from the initial physical position on one of the tracks to the desired location on another of the tracks without crossing the beginning of wrap or end of wrap regions.

32 30. (New) The apparatus of claim 29 wherein the tape includes partitioned logical data distributed along the length of the tape and data partition information, the apparatus being in combination with a drive for the tape and a head for reading the tape, the drive being arranged to be responsive to the determined data set number and the determined track number and the data position information on the tape for positioning the head at the determined data set number and the determined track number.

31. (New) The apparatus of claim 29 wherein the processor arrangement is arranged for determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark by (i) determining the current physical position of the head relative to the tracks in response to (a) and (b), (ii) estimating the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark based on current position parameters, and (iii) iteratively changing the

estimated location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark until the correct location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is found.

32. (New) The apparatus of claim 31 wherein the processor arrangement is arranged to perform (iii) by (1) determining if the determined location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is greater or less than an indication of the current position of the head relative to the tracks, (2) changing the indication of the current position by $+N$ and $-N$ in response to the desired location being respectively greater and less than the current position, where N is a predetermined number of data sets, (3) reading the record numbers and file mark numbers and data set numbers and track numbers for the location associated with the indication of the current position $\pm N$, (4) making a new estimate based on (3), and (5) repeating (1), (2), (3) and (4) until the correct target position is found.

33. (New) A method of enabling a tape to be driven from an initial position associated with an initial record number and initial file mark to a desired location associated with a desired record number and desired file mark in response to a request for retrieval of the data at the desired record number and desired file mark, the tape having parallel tracks, the method being performed with a storage device external to the tape, the storing device storing (a) record numbers and file marks and (b) data set numbers on the tape and numbers of tracks on the tape, the stored record numbers and file marks corresponding with the stored data set numbers and

track numbers,

the method comprising determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark in response to (a), (b) and (c) the desired record number and the desired file mark.

34. (New) The method of claim 33 wherein the tape includes partitioned logical data distributed along the length of the tape and data partition information, the method further comprising positioning a head for data on the head at the determined data set number and the determined track number in response to the determined data set number and the determined track number and the data position information on the tape.

B2 35. (New) The method of claim 34 wherein the tracks include beginning of wrap and end of wrap regions, the method further comprising moving the head from the initial position on one of the tracks to the desired location on another of the tracks without crossing the beginning of wrap or end of wrap regions.

36. (New) The method of claim 33 wherein the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is determined by (i) determining the current physical position of the head relative to the tracks in response to (a) and (b), (ii) estimating the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark based on current position parameters, and (iii) iteratively changing the estimated location on the tape of the data set number and track number corresponding with the desired record number and the

desired file mark until the correct location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is found.

37. (New) The method of claim 36 wherein step (iii) is performed by (1) determining if the determined location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is greater or less than an indication of the current position of the head relative to the tracks, (2) changing the indication of the current position by $+N$ and $-N$ in response to the desired location being respectively greater and less than the current position, where N is a predetermined number of data sets, (3) reading the record numbers and file mark numbers and data set numbers and track numbers for the location associated with the indication of the current position $\pm N$, (4) making a new estimate based on (3), and (5) repeating (1), (2), (3) and (4) until the correct target position is found.

B2 38. (New) A method of enabling a tape to be driven from an initial position associated with an initial record number and initial file mark to a desired location associated with a desired record number and desired file mark in response to a request for retrieval of the data at the desired record number and desired file mark, the tape having parallel tracks, the method being performed with a storage device storing (a) record numbers and file marks and (b) data set numbers on the tape and numbers of tracks on the tape, the stored record numbers and file marks corresponding with the stored data set numbers and track numbers, the method comprising determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark in response to (a), (b) and (c) the desired record number and the desired file mark determining the location on the tape of the data

set number and track number corresponding with the desired record number and the desired file mark by (i) determining the current physical position of a head relative to the tracks in response to (a) and (b), (ii) estimating the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark based on current position parameters, and (iii) iteratively changing the estimated location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark until the correct location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is found.

32 39. (New) The method of claim 38 wherein step (iii) is performed by (1) determining if the determined location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is greater or less than an indication of the current position of the head relative to the tracks, (2) changing the indication of the current position by $+N$ and $-N$ in response to the desired location being respectively greater and less than the current position, where N is a predetermined number of data sets, (3) reading the record numbers and file mark numbers and data set numbers and track numbers for the location associated with the indication of the current position $\pm N$, (4) making a new estimate based on (3), and (5) repeating (1), (2), (3) and (4) until the correct target position is found.

40. (New) The method of claim 38 wherein the tape includes partitioned logical data distributed along the length of the tape and data partition information, the method further comprising positioning a head for data on the head at the determined data set number and the determined track number in response to the determined data set number and the determined

track number and the data position information on the tape.

41. (New) A method of enabling a tape to be driven from an initial position associated with an initial record number and initial file mark to a desired location associated with a desired record number and desired file mark in response to a request for retrieval of the data at the desired record number and desired file mark, the tape having parallel tracks, the method being performed with a storage device storing (a) record numbers and file marks and (b) data set numbers on the tape and numbers of tracks on the tape, the stored record numbers and file marks corresponding with the stored data set numbers and track numbers, the tracks including beginning of wrap and end of wrap regions, the method comprising determining the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark in response to (a), (b) and (c) the desired record number and the desired file mark, the tracks including beginning of wrap and end of wrap regions, moving the head from the initial physical position on one of the tracks to the desired location on another of the tracks without crossing the beginning of wrap or end of wrap regions.

42. (New) The method of claim 41 wherein the tape includes partitioned logical data distributed along the length of the tape and data partition information, the method further comprising positioning a head associated with the tape at the determined data set number and the determined track number in response to the determined data set number and the determined track number and the data position information on the tape.

43. (New) The method of claim 41 wherein the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is determined by (i) determining the current physical position of the head relative to the tracks in response to (a) and (b), (ii) estimating the location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark based on current position parameters, and (iii) iteratively changing the estimated location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark until the correct location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is found.

44. (New) The method of claim 43 wherein step (iii) is performed by (1) determining if the determined location on the tape of the data set number and track number corresponding with the desired record number and the desired file mark is greater or less than an indication of the current position of the head relative to the tracks, (2) changing the indication of the current position by $+N$ and $-N$ in response to the target position being respectively greater and less than the current position, where N is a predetermined number of data sets, (3) reading the record numbers and file mark numbers and data set numbers and track numbers for the location associated with the indication of the current position $\pm N$, (4) making a new estimate based on (3), and (5) repeating (1), (2), (3) and (4) until the correct target position is found.
